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The Regional Greenhouse Gas Initiative (RGGI)

Air and Radiation Management Administration

Climate Change Division

May 27, 2016

Basics

- Maryland officially became the 10th member of RGGI on April 20, 2007
- RGGI is a regional cap and invest program focused on reducing carbon dioxide (CO_2) emissions from power plants
  - Cooperative 9 state effort
    - Connecticut, Delaware, Maine, Maryland, Massachusetts, New Hampshire, Rhode Island, Vermont
    - New Jersey was originally a member but left the program
- Not your "typical" cap and invest program
  - CO_2 reductions achieved by reduced demand, not "scrubbers" or other end-of-the-pipe pollution control technologies
  - RGGI reductions to be achieved by
    - Setting a cap for the region
    - Auctioning allowances
    - Using auction proceeds to create incentives for energy efficiency and reduced demand
- Will result in a small, but positive benefit to Maryland electricity consumers

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Original RGGI Goals

- Original RGGI goal was to show that a cap and invest program for CO_2 was possible
  - Modest reduction goal
  - Proactive concept to provide revenue for energy efficiency programs and to cover cost of program through sale of allowances
- Generation-based Program
  - Each state apportionment set at average 2000 – 2002 emissions
- 10% Reduction Goal
  - Offset growth in emissions and make a small reduction

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Auctions

- Primary and Secondary market auction platform
- Participation in all 31 quarterly auctions to date
- Total amount of proceeds from RGGI auctions more than $2.45 billion
  - $505.8 million for Maryland
- Strategic Energy Investment Fund (SEIF)
- Cost Containment Reserve
- Auction 32 to be held on June 1, 2016

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Auction Design Principles

- Fair, transparent, and understandable to participants and the public
- Promotes accurate price discovery
  - Where price reflects a measure of marginal cost to reduce emissions
- Guards against collusion and/or market manipulation
- Minimizes price volatility
- Promotes a liquid allowance market

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Cost Containment Reserve (CCR)

- The CCR allowances will be sold at any auction if demand for allowances causes prices to be above the CCR trigger price and exceeds the supply of non-CCR allowances, until all CCR allowances available for the year are sold
- CCR allowances will only be sold at or above the CCR trigger prices of $8 in 2016, $10 in 2017, and adjusted up 2.5% in each calendar year thereafter
- The CCR allowances will be in addition to the cap and be fully fungible
- A fixed annual quantity of 10 million CCR allowances after 2014

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Offsets

- An offset project may compensate for a fraction of the required emission reductions from a CO_2 budget source
- Very strict eligibility criteria

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Offset Categories

- Landfill Methane Capture and Destruction
- Reduction in Emissions of Sulfur Hexafluoride (SF_6)
- Sequestration of Carbon due to U.S. Forest Projects
- Reduction or Avoidance of CO_2 Emissions from Natural Gas, Oil, or Propane End-Use Combustion due to End-Use Energy Efficiency
- Avoided Methane Emissions from Agricultural Manure Management Operations

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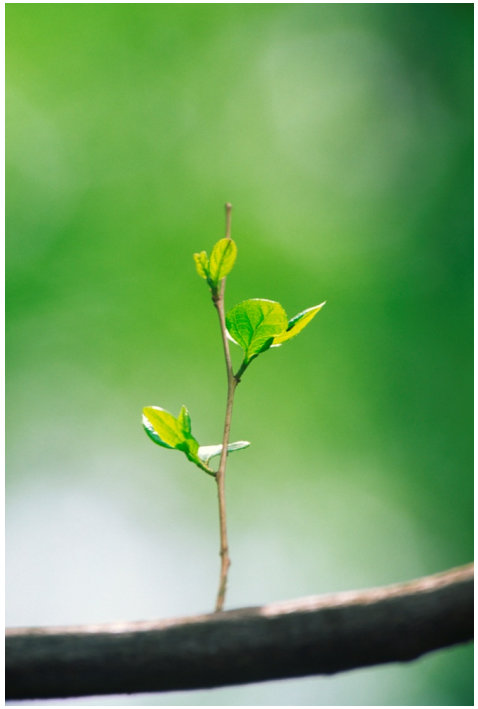
2010/2012 Review

- 2010 review required by COMAR 26.09.02.02E
- Contract with Regional Economic Studies Institute (RESI) to conduct review
  - Reviewed auctions, auction prices, electricity generation in MD, set-aside accounts, COATS, and an overall impact analysis
  - Draft delivered August 1, 2010
- 2012 review required by RGGI MOU
  - Required a review of all components of the RGGI program
  - Determined that a future program review would occur no later than 2016



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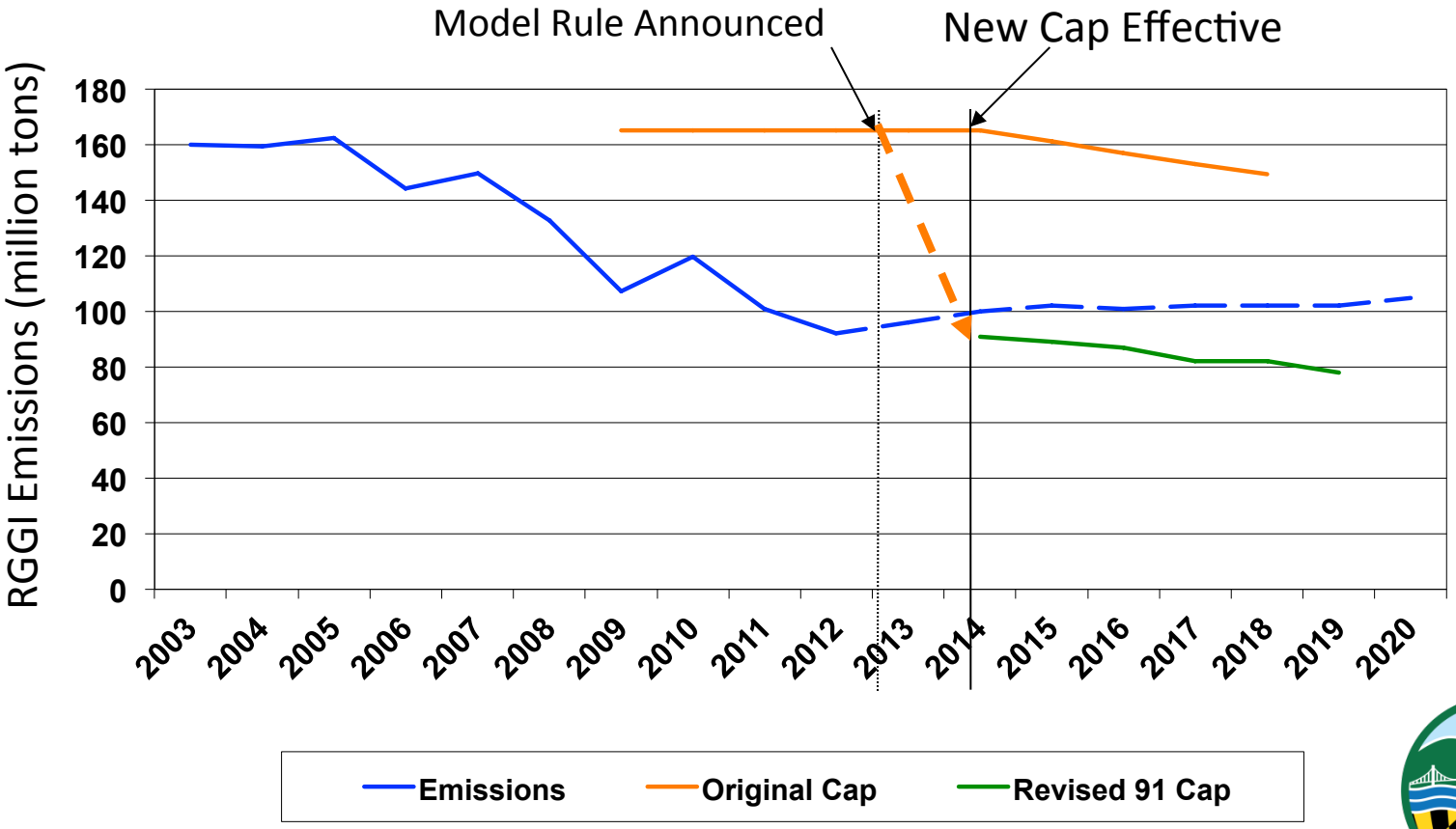
2012 Program Review



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Reasons for Review

- RGGI was the first cap and invest CO_2 program in the nation, a good state that can be made better

- Analyses indicated that proposed changes would:
  - Preserve significant reductions that have already occurred in power sector CO_2 emissions, and drive further reductions
    - 91 cap projected to generate:
      - ~80 – 90 million tons of cumulative emission reductions by 2020
      - ~14 – 20 million tons less of annual emissions in 2020
  - Result in a modest increase in allowance prices
    - ~$4 ($2010) per allowance in 2014
    - ~$10 ($2010) per allowance in 2020
  - Have minimal net impact to consumer's electricity bills
  - Average electricity bill for MD residential, commercial, and industrial customers projected to increase by less than 1%
  - Generate an additional $2.67 billion ($2010) regionally for reinvestment into energy efficiency (through 2040)

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2016 Review

- 2016 Program Review will follow the same format as the 2012 Program Review
- On behalf of the RGGI states, RGGI, Inc. will facilitate public stakeholder meetings to gather stakeholder input for the states' 2016 Program Review
- 2016 Program Review will solicit stakeholder input on RGGI program design elements, including considerations for compliance under the EPA Clean Power Plan
- RGGI states may also hold state-specific stakeholder meetings
- RGGI states will engage in routine private conferences to review and reach a consensus on any changes to the RGGI program
  - A review of all components of the RGGI program will occur

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RGGI Stakeholder Meetings

- November 17, 2015
  - New York, NY
- February 2, 2016
  - Wilmington, DE
- April 29, 2016
  - Boston, MA
- June 17, 2016
  - Webinar

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Strategic Energy Investment Fund (SEIF)

- Maryland Legislature granted administration of the Maryland RGGI revenues to the Maryland Energy Administration
  - Revenues are deposited in SEIF
- Maryland Legislature apportioned the revenue to a number of different uses
  - Low income bill payment
  - Low and moderate income energy efficiency
  - Rate payer relief
  - Renewable energy and climate programs
  - Administration of the program

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CPP Summary

The Clean Power Plan will:

- Reduce carbon pollution from existing power plants, for which there are currently no national limits.
- Maintain an affordable, reliable energy system.
- By 2030, reduce nationwide carbon dioxide (CO_2) emissions, from the power sector by approximately 30% from 2005 levels.
  - Significant reductions begin by 2020.
- Cut hundreds of thousands of tons of harmful particle pollution, sulfur dioxide and nitrogen oxides as a co-benefit.
- Provide important health protections to the most vulnerable, such as children and older Americans.
- Lead to health and climate benefits worth an estimated $55 billion to $93 billion in 2030.
- From soot and smog reductions alone, for every dollar invested through the Clean Power Plan – American families will see up to $7 in health benefits.

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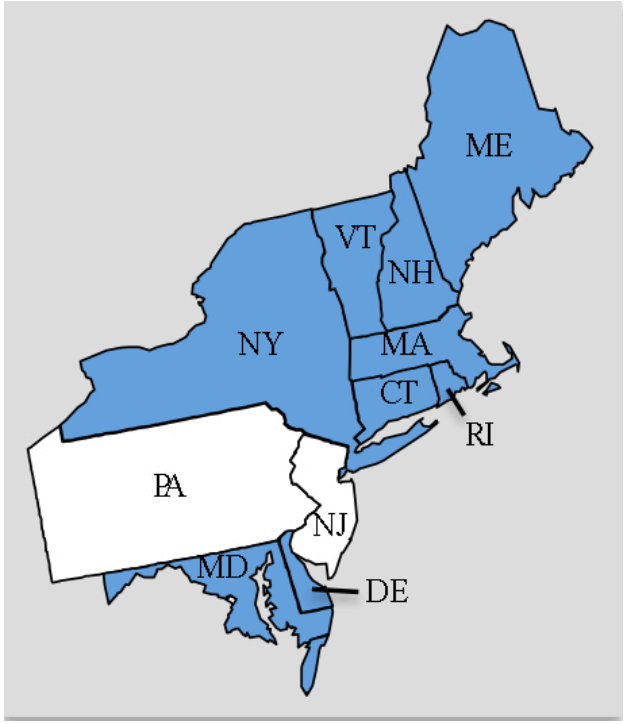
Maryland's Plan

- Maryland will use the Regional Greenhouse Gas Initiative (RGGI) as a compliance pathway.
- The RGGI states are working together because the RGGI Cap is mass-based. So a translation from rate-based standard to a mass cap will have to be completed. This requires modeling.
- Maryland is coordinating with Delaware, since we are the only two RGGI PJM states and the only EPA Region III RGGI States.



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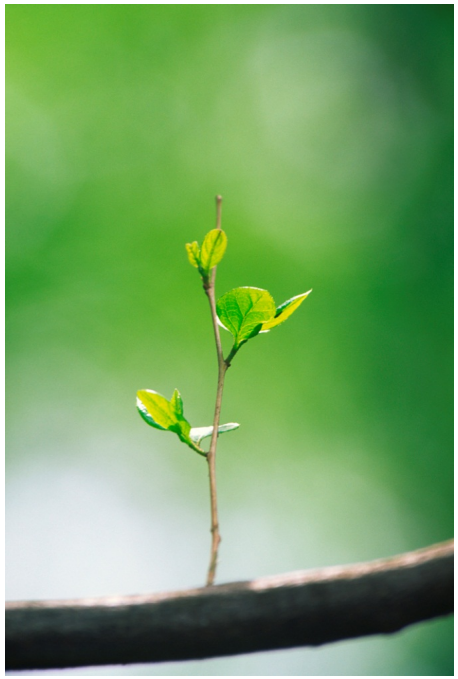
Next Steps

- Information on the Clean Power Plan can be found at the EPA website: https://www.epa.gov/cleanpowerplan/clean-power-plan-existing-power-plants
- On February 9, 2016, the Supreme Court stayed implementation of the Clean Power Plan pending judicial review.
- For the states that choose to continue to work to cut carbon pollution from power plants and seek EPA's guidance and assistance, EPA will continue to provide tools and support.
- The D.C. Court of Appeals for the District of Columbia Circuit announced that the full court will hear arguments on the EPA's Clean Power Plan, rather than a panel of three judges – a practice known as sitting "en banc." The hearing date for the regulatory package has been pushed back from June 2 to September 27.



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Why we need Energy Market Modeling

- To analyze a complex system (like an energy market) in an understandable form
- To organize large amounts of data; and
- To provide a framework to test hypotheses
- The goal is to develop a projection of market energy, allowance and fuel prices to inform decisions
- Power plants can be operating way into the future – making assumptions is a requirement
- The Integrated Planning Model (IPM) model is our tool of choice

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The IPM Model

- A cost simulation model focused on analyzing wholesale power markets and assessing environmental compliance and competitive market prices
- Includes existing and planned units, coal and gas markets, environmental compliance and allowance prices, operating constraints, etc
- Estimates generation, new power plant construction, fuel consumption, and inter-regional transmission flows
- Determines the least-cost means of meeting the environmental regulatory requirements and forecasts allowance prices for each cap and trade market and compliance costs, unit dispatch, and retrofit decisions

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2016 RGGI Program Review: Modeling Approach

- Two Reference Cases
  - RGGI as-is without Clean Power Plan
  - with RGGI and Clean Power Plan (CPP) in Effect
- Potential Policy Runs Based on Stakeholder Comments

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What is a Reference Case?

- The first set of runs completed by the RGGI states for the 2016 Program Review are known as the "Reference Case" runs
- These runs are designed to show how similar—or different—the model outputs (such as capacity or generation emissions, or allowance prices, or electricity cost) would be without doing anything different than the current suite of policies.
- The Policy Scenario Runs (discussed in the next section by Chris Hoagland) have the same input assumptions, but change the RGGI policy, so show how changes in RGGI could cause changes in the electricity sector

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2016 RGGI Program Review: two reference cases

- For the 2016 Program Review, the RGGI states developed two reference cases:
  - 2016 Program Review Reference Case
  - Clean Power Plan (CPP) Nationally Case

- The CPP Nationally Reference Case assumes that:
  - EPA Clean Power Plan is implemented in states outside of RGGI
  - incorporates nationwide CPP requirements for non-RGGI states
  - the 2020 RGGI cap and other program components (CCR and offsets) is extended flat to the end of the modeling time horizon.

Inputs/Assumptions that impact what happens in other states under CPP

- Rate vs Mass based – assume mass-based
- Trading vs single state programs – assume trading
- Consider PJM effects separately from the rest of the country

Question: What should we consider as the reference case for what happens to RGGI with CPP in effect around us?

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Scenarios

	Changes to RGGI	Clean Power Plan
Program Review (PR) Reference	X	X
CPP Reference	X	✓
Model Run 1 (MR1)	✓ (minor)	✓

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Assumptions

Assumption	Program Review (PR) Reference Case	CPP Nationally (CPP) Reference Case
RGGI Cap	2020 cap extended through end of modeling horizon	
RGGI Cost Containment Reserve (CCR)	10 million tons available in each year with trigger price rising at 2.5% annually through end of modeling horizon	
RGGI Offsets	Offsets allowed for up to 3.3% of compliance through end of modeling horizon at $25/ton	
RGGI Trading	Trading of RGGI allowances among RGGI states	
Clean Power Plan Caps	None	States outside of RGGI subject to mass caps covering existing and new units
Clean Power Plan Trading	None	Trading among all states outside of RGGI

Reduced after 2025 in Model Run 1

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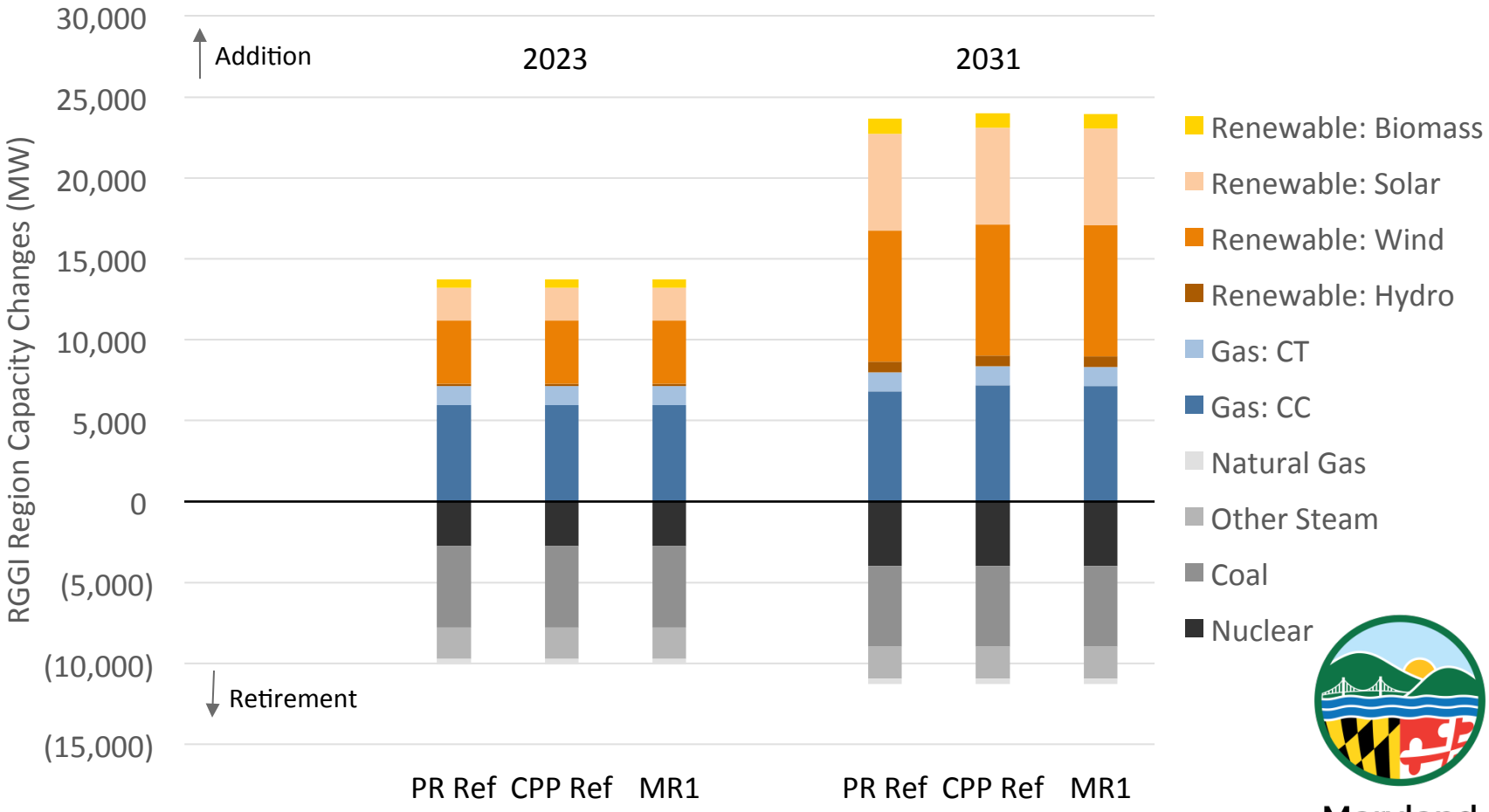
Capacity Changes



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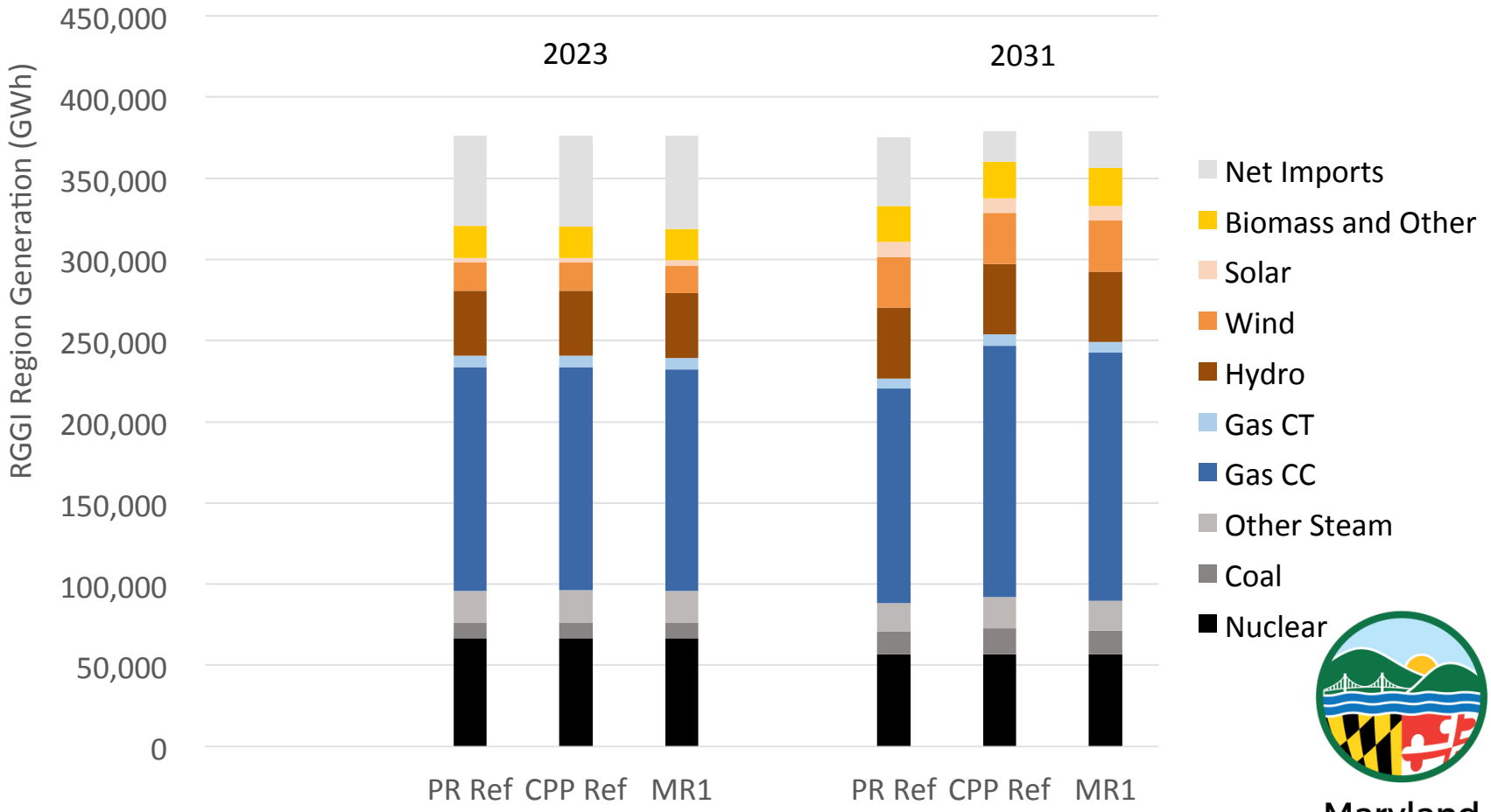
Generation Mix



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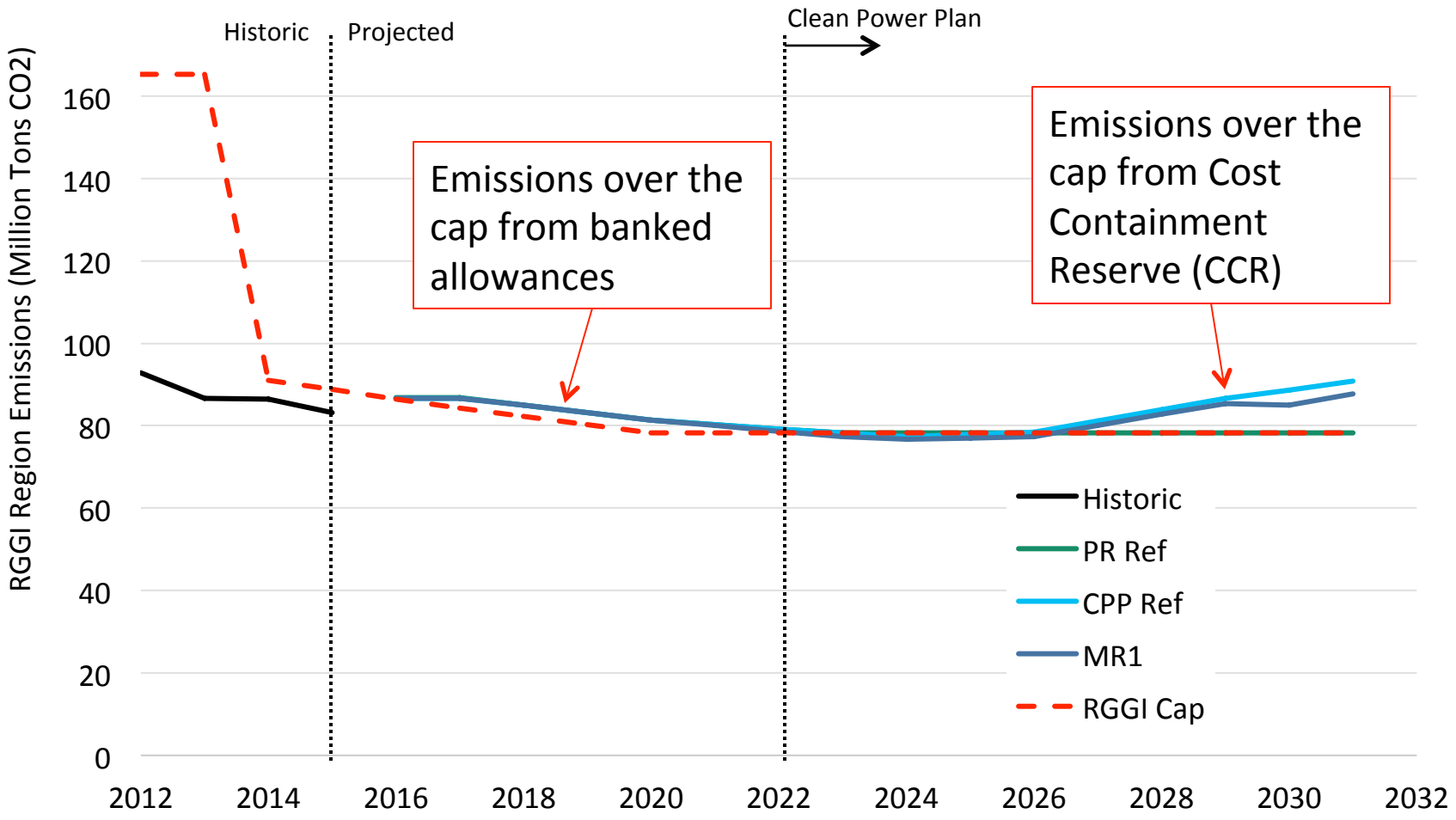
Emissions



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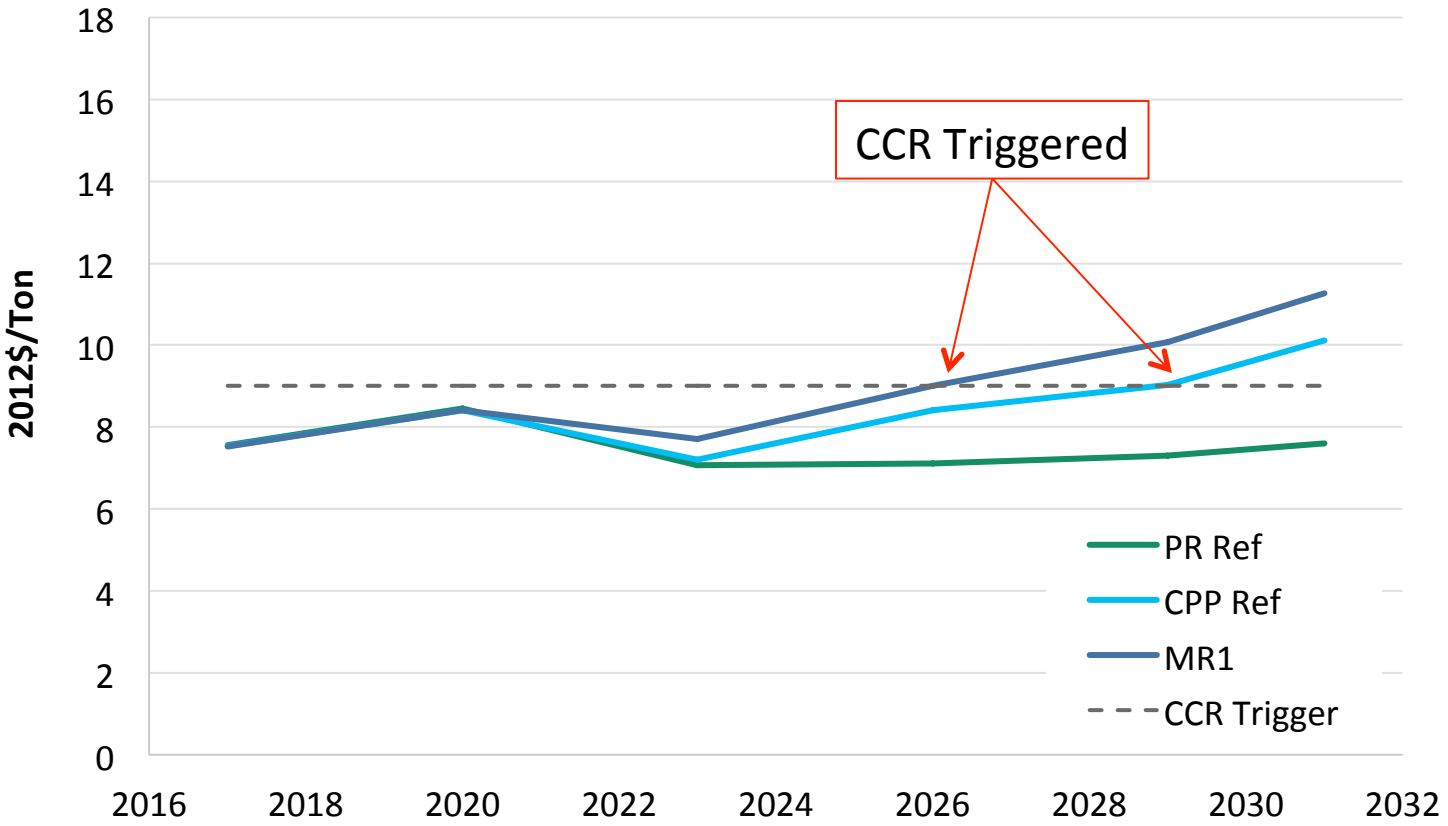
Allowance Prices



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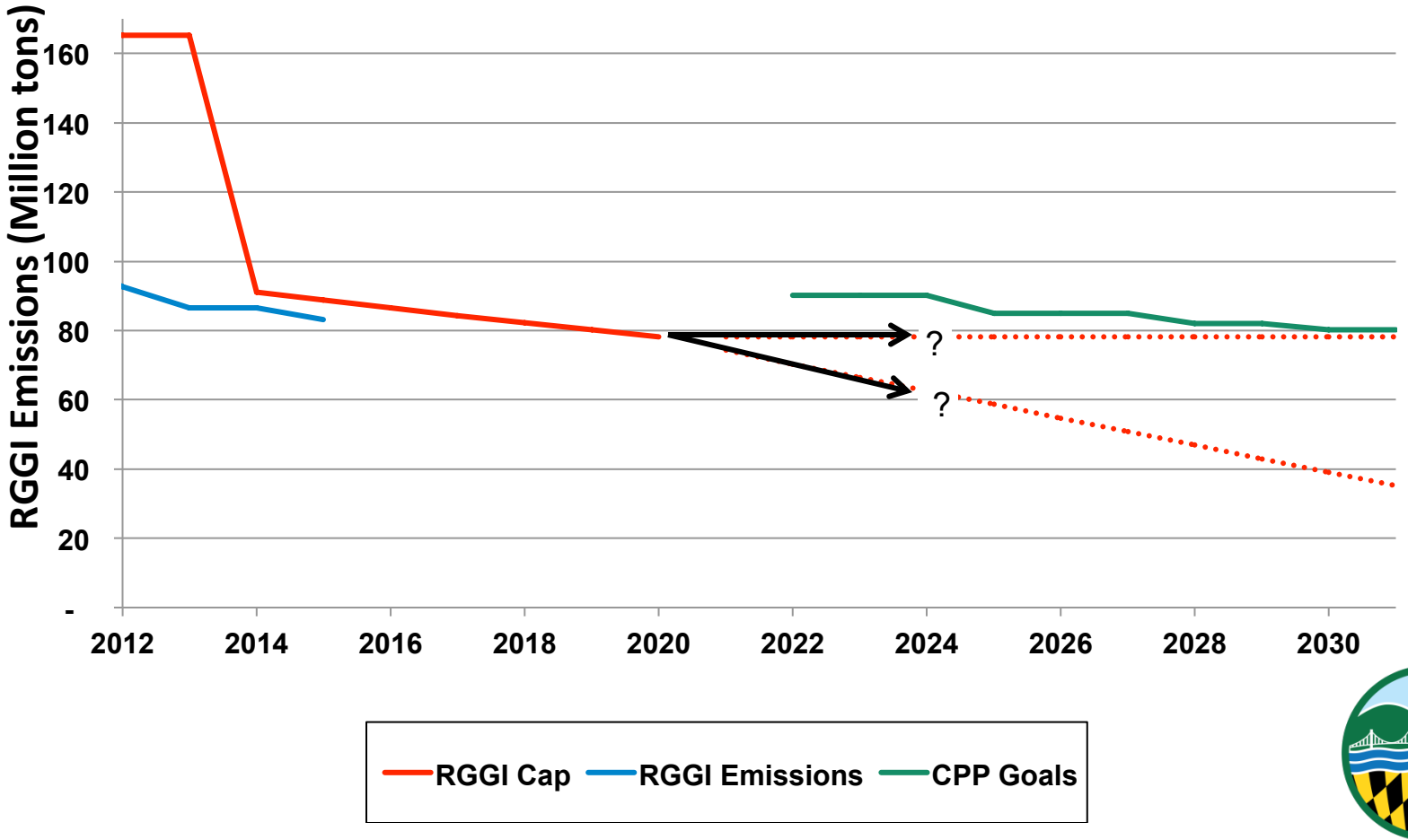
What Caps Should We Consider?



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Commenting to RGGI

- RGGI, Inc. accepts comments by email at: info@rggi.org
- RGGI, Inc. publishes Meeting Notices and Modeling Results at: http://www.rggi.org/design/2016-program-review/rggi-meetings

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Questions?

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